SYSTEMATIC POSITION OF THE GENERA *TRIODIA* R.BR. AND *PLECTRACHNE* HENR. (GRAMINEAE)

S. Jacobs
Botany Building, School of Biological Sciences,
University of Sydney

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Synopsis

The taxonomic position of *Triodia* and *Plectrachne* is investigated using essentially non-floral characters from 23 species of *Triodia* and two species of *Plectrachne*. The characters used are (i) morphology of the first seedling leaf, (ii) silica cells, (iii) bicellular microhairs, (iv) bundle sheath anatomy, (v) iodine staining, (vi) lodicules, (vii) chlorenchyma cells, (viii) starch grain morphology, and (ix) chromosome number and size. The usefulness and significance of these characters is discussed and the variation noted. From these characters it appears that the two genera are either Panicoid or Eragrostoid, but after consideration of floral morphology it is concluded that they are distinctly Eragrostoid and could perhaps be considered as primitive representatives of the tribe Eragrosteae.

The validity of the generic division between the two genera is discussed and accepted from present data.

Introduction

The position of *Triodia* and *Plectrachne* within the family Gramineae has been a source of some disagreement. Mueller (1858–1882) implies a close relationship with *Festuca*, if only by placing some *Triodia* species in that genus. Hubbard (1934) placed them in his tribe Eragrosteae and this system was retained for nearly 20 years. Vickery (1953) includes *Triodia* amongst members of the tribe Eragrosteae. Gardner (1952) distributed members of the tribe Eragrosteae, which he did not recognize, between his tribes Festuceae and Chlorideae. He placed *Triodia* and *Plectrachne* in the tribe Festuceae, along with other genera now included in the tribe Danthoneae, and this system has been retained by Vickery (1961).

These opinions have been largely based on comparative gross morphology. Although Burbidge (1946) presented an extensive study of the leaf anatomy of Western Australia *Triodia* species, little seems to have been done to incorporate these results into the classificatory system.

Since the work of Avdulov (1931) grass taxonomy has included more and more microscopic characters. The incorporation of these features has solved some seemingly intractable systematic problems, and the present investigation was undertaken to determine whether these characters could clarify the systematic position of *Triodia* and *Plectrachne*.

Methods

The references accompanying each of the methods refers to publications in which the basis for the descriptive technique used here is set out.

The characters and methods used were :

(1) The morphology of the first seedling leaves (Bor, 1960) were observed after germinating seeds of *T. pungens*, *T. basedowii* and *T. irritans* in sand.

(2) Preparations for the study of silica cells (Metcalfe, 1960) were prepared by boiling portions of the leaf blade in a 1 : 1 : 1 mixture of 90 vols.

hydrogen peroxide : glacial acetic acid : water, until colourless, then transferring through a series of solutions to xylol and finally mounting whole in polystyrene.

(3) Bicellular microhairs (Tateoka, 1959) which were visible in the preparation for the silica cells.

(4) Bundle sheath anatomy (Brown, 1958) was determined by preparing transverse sections with a sledge microtome, using sections from near the centre of two leaves if possible ; double staining the sections with safranin and aniline blue, and subsequently mounting them in polystyrene.

(5) Iodine staining for location of areas of starch formation is a relatively new technique for which no records of any extensive investigations have been found to date. It was found that all sections had to be prepared from leaves collected immediately before staining if a consistent result was to be obtained. Sections were mounted in a weak iodine solution and no permanent mounts were prepared.

(6) Lodicules (Tateoka, 1960) were dissected from inflorescences, freshly preserved in 70% alcohol, mounted on slides, and drawn with the aid of a drawing apparatus.

(7) Separated chlorenchyma cells (Jacques-Felix, 1962 ; Freir, 1959) were prepared by macerating the leaf blade in a 1 : 1 mixture of 10% nitric acid and 10% chromic acid for approximately two to three days. After treatment, the material was transferred to absolute alcohol and, gently squashing the material, mounted in euparal.

(8) Starch grain morphology (Tateoka, 1962) was determined by scratching the surface of a seed of *T. pungens* and staining the starch obtained with a weak solution of iodine.

(9) Chromosome number and chromosome size (Avdulov, 1931) root tips were treated in 8-hydroxy quinoline for 3–4 hours, macerated in a 1 : 1 concentrated HCl and ethanol mixture, then stained in aceto-orcein.

The type species for the genus *Plectrachne* was designated by Henrard as *Plectrachne schinzii* in *Schinz. Vierteljahrs Naturf. Ges. Zürich* (74 : 132), whilst the type species for *Triodia* has been taken as *Triodia pungens* R.Br. (see Hitchcock, 1920). Both these species, as well as 22 other species of *Triodia* and one other species of *Plectrachne*, were examined for as many of the above characters as possible.

MATERIALS

All specimens for leaf characters were obtained from the National Herbarium of N.S.W., the majority of which were determined by Dr. N. T. Burbidge.

Seed material was obtained by collections made by the author for *T. basedowii* and *T. irritans* and from Dr. N. T. Burbidge for *T. pungens*.

Fresh sections for starch formation were obtained from specimens, collected by the author, growing in the Botany Department, University of Sydney.

Material for the lodicules was obtained from collections made by the author for *T. irritans* and from herbarium specimens from the N.S.W. National Herbarium for *T. longiceps* and *T. pungens*.

Material for chromosome counts was obtained from specimens growing in the Botany Department, University of Sydney.

RESULTS

(1) The morphology of the first seedling leaf has been classified into two main classes (Bor, 1960 ; Jacques-Felix, 1962) :

(i) Panicoid: characterized by an ovate to narrow-ovate first seedling leaf.

(ii) Poöid: characterized by a linear first seedling leaf.

Of these two classes, *Triodia basedowii* has a narrow-ovate first seedling leaf and is therefore Panicoid, and both *Triodia pungens* and *Triodia irritans* have linear first seedling leaves and are therefore Poöid.

(2) The characteristic silica cell shapes for various tribes have been described in detail by several authors (Duval-Jouve, 1875; Prat, 1932; Metcalfe, 1960; Bor, 1960; Jacques-Felix, 1962). In *Triodia* and *Plectrachne* several different forms were encountered which could be divided into two types (Fig. 1 (*a*)), viz. the basic Panicoid, or dumb-bell shape, and a series of similar types showing affinities with the Eragrostoid forms. Table 1 indicates an almost equal division of the species with Panicoid and Eragrostoid characteristics.

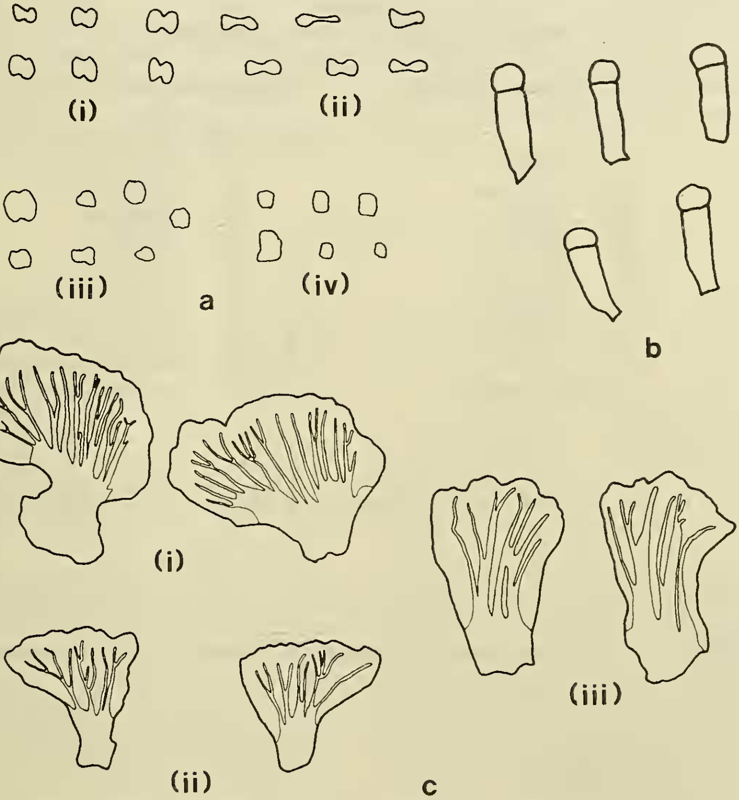

Fig. 1. (*a*) Silica cells or bodies of (i) *T. concinna*, (ii) *T. pungens*, (iii) *T. fitzgeraldii*, and (iv) *T. basedowii*. All ×250. (i) and (ii) are characteristic Panicoid forms and (iii) and (iv) are characteristic Eragrostoid form. (*b*) Bicellular microhairs from *T. irritans* (×500). A typical Eragrostoid form. (*c*) Lodicules of (i) *T. longiceps* (×60), (ii) *T. pungens* (×36), (iii) *T. irritans* (×42). Showing variations of the basic cuneate Eragrostoid form.

The silica cells of the *Plectrachne* spp. examined were observed to be well inside the range of variation exhibited by the *Triodia* spp.

Silica cell shapes are generally considered of importance as taxonomic characters, and presumably they are of use in the majority of cases for tribal classifications, but the presence of two very different forms in one genus makes their use difficult in this particular case. On the evidence available, sub-family classification has two alternatives (viz. Panicoideae or Eragrostoideae), but Panicoid silica cell forms have been reported in sub-family Eragrostoideae by Tateoka (1959).

(3) Bicellular microhairs were analysed using two ratios and a derived angle as an index of shape (Tateoka, 1959). The characteristics used were :

(i) $\dfrac{\text{Maximal width.}}{\text{Total length}}$

(ii) $\dfrac{\text{Length of upper cell.}}{\text{Length of lower cell}}$

(iii) $\theta = \tan^{-1}.\ \text{Maximal width} - \text{basal width} \times \dfrac{1}{\text{Length from base to rim of maximal width}}.$

TABLE 1

Grouping of Species on Silica-cell Shapes

Panicoid-type Silica Cells	Eragrostoid-type Silica Cells
Triodia pungens	*Triodia basedowii*
T. mitchelli	*T. secunda*
T. marginata	*T. fitzgeraldii*
T. irritans	*T. longiceps*
T. concinna	*T. clelandii*
T. hostilis	*T. wiseana*
T. stenostachya	*T. racemigera*
T. microstachya	*T. roscida*
T. hubbardii	*T. inutilis*
T. spicata	*T. inaequiloba*
T. lanata	*T. burkensis*
Plectrachne pungens	*T. intermedia*
P. schinzii	

TABLE 2

Class Limits used for the Presentation of Microhair Data (Table 3)

Characteristics	Class				
	0	1	2	3	4
$\dfrac{\text{Maximal width}}{\text{Total length}}$	0·125	0·126–0·250	0·251–0·375	0·376–0·500	0·501
$\dfrac{\text{Length of upper cell}}{\text{Length of lower cell}}$ ..	1·801	1·800–1·301	1·300–1·801	0·800–0·301	0·300
Angle between the axis of the hair and the line connecting the basal rim with the rim of maximal width ..	1°	2°–6°	7°–11°	12°–16°	17°

Each of these characteristics was subjectively divided into classes, class numbers or index values being assigned to each (Table 2), and presented in the form A (B, C, D), where B, C, D represent index values for characteristics (i), (ii) and (iii) respectively, and " A " represents the sum of the index values B, C and D (Table 3) (see Tateoka, 1959).

The calculations for Table 2 were based on a sample of five hairs and a mean value taken, the variation being small. Tateoka (1959) also accepts this sampling method as being accurate.

The microhairs (Fig. 1 (*b*)) are all very similar, and there is a continuous range of variation amongst the species, but a large section of the variation of index numbers could be ascribed to the establishment of arbitrary classes.

The range of values for these hairs occurs within the range of variation covered by the sub-family Eragrostoideae and would be classified under Tateoka's tribe Chlorideae, in which he includes the two tribes Eragrosteae and Chlorideae of other workers. For *Triodia* and *Plectrachne* bicellular microhairs appear advantageous as taxonomic characters because of their relative uniformity between the species. It should be noted that the two species of *Plectrachne* investigated occur within the range of variation observed within *Triodia.*

(4) Brown (1950) interpreted results published by Burbidge (1946) as being indicative of a Festucoid (Poöid) leaf anatomy. A Poöid leaf anatomy is characterized by a mestome or fibrous sheath surrounded by a parenchymatous sheath, although the latter is scarcely differentiated from the surrounding mesophyll, and contains chloroplasts approximately the same size as those of the mesophyll (Bor, 1960). The drawings and photographs presented by Burbidge are undoubtedly accurate, but their reproduction was not intended to show this scale of difference and, with a more critical study of the leaf, it can be seen to be very different from that typified as Poöid.

TABLE 3

Index Values from Microhair Data for the Species Examined

Species	Index	Species	Index
Triodia irritans	6 (2, 4, 0)	*Triodia concinna*	7 (2, 4, 1)
T. hostilis	6 (2, 3, 1)	*T. stenostachya*	7 (2, 4, 1)
T. fitzgeraldii	6 (2, 3, 1)	*T. clelandii*	7 (2, 4, 1)
T. basedowii	6 (2, 3, 1)	*T. racemigera*	7 (2, 4, 1)
T. pungens	7 (3, 3, 1)	*T. burkensis*	7 (2, 4, 1)
T. longiceps	7 (3, 3, 1)	*T. inaequiloba*	8 (3, 4, 1)
T. intermedia	7 (3, 3, 1)	*T. mitchelli*	8 (3, 4, 1)
T. microstachya	7 (3, 3, 1)	*T. secunda*	8 (4, 3, 1)
Plectrachne pungens	7 (3, 3, 1)	*T. marginata*	8 (3, 3, 2)
P. schinzii	7 (3, 3, 1)		

Triodia and *Plectrachne* are typified by relatively small areas of chlorenchyma enclosed by a well developed " bundle sheath " extended from around the vascular bundles (Fig. 2) and the relative size of the chloroplasts in the sheath appears to vary somewhat from being slightly larger to very much larger than those chloroplasts in the chlorenchyma. The range of differences between chloroplast sizes could be a result of drying the herbarium specimens, or of staining techniques. Sections of fresh material should produce more standardized results, but to date only fresh sections of *Triodia irritans*, from the Capertee Valley (which in fact has some characters in common with *T. scariosa*, but for the purpose of this paper it will be referred to as *T. irritans*) have been possible and these show a large size difference between the large sheath chloroplasts and the smaller ones in the chlorenchyma. This leaf anatomy could be characteristic of two sub-families, viz. Panicoideae and Eragrostoideae, the difference between the two being primarily the size difference between sheath chloroplasts and those of the chlorenchyma.

When comparing differences in leaf anatomy within the genera, using the division as suggested and illustrated by Burbidge (1953), which is based on the distribution of stomatal grooves on the abaxial surface of the lamina, then three arbitrary classes or divisions are obtained :

(i) Stomatal grooves present all over the abaxial surface of the lamineae.
(ii) Stomatal grooves present only below the midrib on the abaxial surface.
(iii) Stomatal grooves absent on the abaxial surface.

Class (i) (Table 4) can be further subdivided on the relative position of the vascular bundle as most of this group have bundles in the centre (T.S.) of the blade, but two, viz. *T. fitzgeraldii* and *T. molesta*, have bundles much nearer to the adaxial surface (Fig. 2 (*b*)). As well as these, there is one species, *T. racemigera*, whose bundles are slightly closer to the adaxial surface, i.e. it forms an intermediate form between *T. fitzgeraldii*, *T. molesta* and the remainder of the class. It is suggested that the bundles being closer to the adaxial surface could have been the first change leading to the loss of chlorenchyma (and stomata) on the lower surface, which would be an obvious ecological advantage for leaves capable of becoming terete under dry conditions. Using this hypothesis, a series of changes could be drawn up, culminating in the *T. hostilis* leaf form, perhaps representing an evolution of the leaf anatomy in response to the arid environment of the Australian interior. The *T. hostilis* leaf form is,

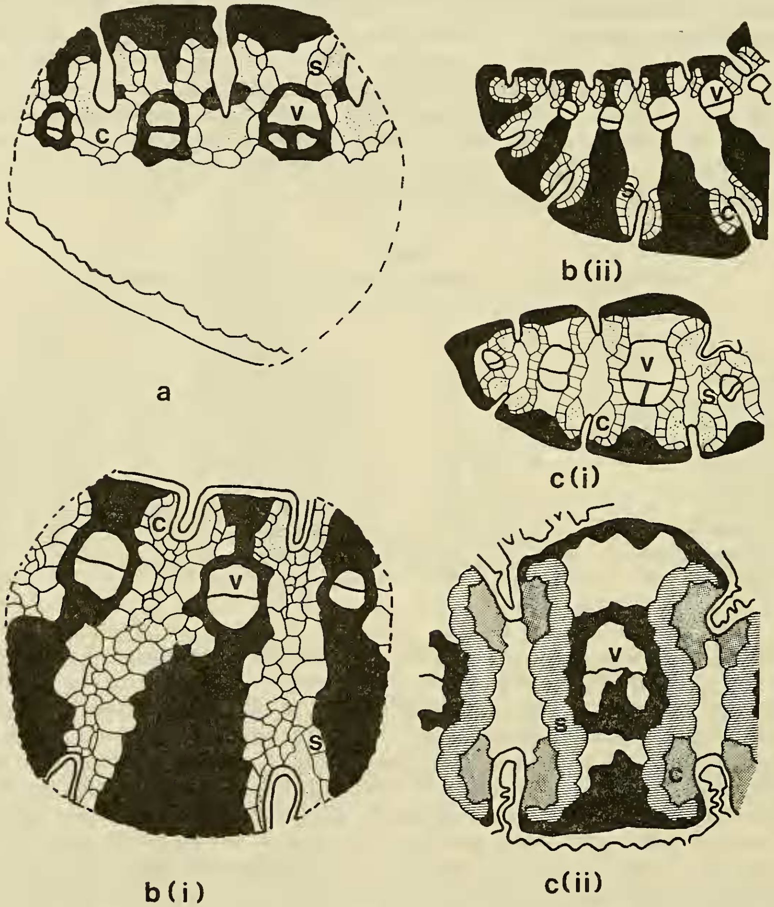

Fig. 2. (*a*) *T. hostilis* (×140), (*b*) (i) *T. fitzgeraldii* (×138), (ii) *T. fitzgeraldii* (×80), (*c*) (i) *T. irritans* (×111), (ii) *T. irritans* (×200). For all figures c=chlorenchyma, v=vascular bundle, s=parenchymatous " bundle " sheath. The completely inked-in areas are sclerenchyma.

in fact, very similar to the *T. pungens* leaf form and different specimens of *T. microstachya* have both types. In the *T. hostilis* leaf (Fig. 2 (*a*)) the " bundle sheath " seems to be highly developed and completely surrounding the chlorenchyma below the stomatal groove, with only a small portion of the sheath coming into actual contact with the bundle. The validity of even considering this sheath as a " bundle sheath " is discussed later.

Between the two genera *Triodia* and *Plectrachne* there is a range of anatomical forms with no particularly distinctive character separating the two genera.

(5) The utilization of starch formation detected by iodine staining as a taxonomic character has been mentioned in the literature (Brown, 1958 ; Bor, 1960) but has not assumed any importance. There are two main classes of reaction to the staining of fresh leaves with iodine :

(i) Members of the Poöideae stain throughout the chlorenchyma including the bundle sheath, whilst

(ii) members of the Panicoideae and Eragrostoideae only stain in the parenchymatous sheath.

TABLE 4

Division of Species on the Distribution of Stomatal Grooves. Class (i) Stomatal grooves present all over the abaxial surface of the laminae. Class (ii) Stomatal grooves present only below the midrib on the abaxial surface. Class (iii) Stomatal grooves absent on abaxial surface

Class (i)	Class (ii)	Class (iii)
T. concinna	*T. hubbardii*	*T. hostilis*
T. inaequiloba	*T. stenostachya*	*T. microstachya*
T. secunda	*T. marginata*	
T. clelandii	*T. pungens*	
T. longiceps	*T. mitchelli*	
T. wiseana	*P. schinzii*	
T. irritans	*P. pungens*	
T. burkensis		
T. lanata		
T. spicata		
T. roscida		
T. intermedia		
T. basedowii		
T. racemigera		
T. inutilis		
**T. molesta*		
**T. fitzgeraldii*		

* Bundles towards adaxial surface.

As well as these classes *Phragmites* sp. (Arundineae) stains only in the chlorenchyma with no staining in the sheath. The differential reactions to iodine staining appear to be related to the C_4 and C_3 photosynthetic pathways.

Triodia irritans (from Capertee Valley) was obtained, sectioned, and stained, revealing starch formation as being limited to the bundle sheath under high light intensities, indicating Panicoid or Eragrostoid affinities. For comparison, transverse sections of the leaf blade of a species of *Danthonia* were cut and stained. These showed Poöid affinities by staining throughout the chlorenchyma and parenchymatous sheath under high light intensities.

(6) Tateoka (1960) discusses the use of lodicules as a taxonomic character, but he only gives descriptions of a few tribes, a notable exception being tribes of the sub-family Panicoideae. From Tateoka's descriptions, the lodicules of *Triodia* (Fig. 1 (*c*)) would be characteristic of members of the tribe Eragrosteae, but only in comparison with other members of the sub-family Eragrostoideae and Poöideae. Prior to the use of lodicule morphology, number of lodicules

had been used to a limited extent, but only for a few tribes. *Triodia* has two cuneate, fleshy lodicules with fairly well developed vascularization.

(7) The value of the shape of the chlorenchyma cell as a taxonomic character has been elucidated by Freir (1959) and Jacques-Felix (1962). Four characteristic forms have been described by these authors :

(i) Poöid (Festucoid). Typical parenchymatous cells being approximately isodiametric with joining lobes.

(ii) Bambusoid-oryzoid. Lobed-tabular cells.

(iii) Panicoid. Ratchet cells with deep constrictions and large angular axes arranged radially.

(iv) Arundinoid. Ratchet cells arranged diffusely.

Of the forms described above, the chlorenchyma cells of *Triodia* would be classified as Poöid, although attention must be drawn to the fact that typical forms of the sub-family Eragrostoideae have hardly been investigated. One species of *Eragrostis* (aff. *brownii*) was examined and found to have Poöid chlorenchyma cells. Further elucidation of chlorenchyma cell morphology as a taxonomic character is essential prior to its widespread adoption.

(8) Tateoka (1962) re-evaluated the divisions of grass tribes based on starch grain morphology and concluded that simple, rounded, starch grains could be separated from compound, or simple, angular starch grains, resulting in two major divisions. The former grain type is characteristic of the sub-family Poöideae, whereas the remaining forms seem to occur throughout the non-Poöid tribes. The starch grains of *T. pungens*, *T. irritans* and *T. basedowii* are all simple and angular, i.e. they are non-Poöid starch grains.

(9) Accurate chromosome counts were difficult because of the unsuitable anther material collected and the thickness of the root tips to be examined. Associated with this was the relatively small number of cells actually dividing. The chromosome size was very small (i.e. non-Poöid—Bor, 1960) and this also complicated accurate counting especially with the rather large numbers found. The numbers quoted can only be given as approximate because of the difficulties mentioned ; *Triodia basedowii* had $2n=60$, *Triodia irritans* had $2n=30$. As can be seen with such numbers, arguments based on tribal characteristics of $n=5$, $n=6$, $n=7$, $n=9$ or $n=10$ tend to be relatively meaningless as by various hypotheses of chromosomal losses or gains it is possible to suggest any of these base numbers as being the original base number before polyploidy.

Discussion

Of the characters investigated, those generally considered to be of greater taxonomic significance are silica cells, bicellular microhairs, leaf anatomy and chromosome number. The results from the silica cells, leaf anatomy and chromosome size suggest Panicoid or Eragrostoid affinities, whereas the bicellular microhairs are more specific, indicating Eragrostoid affinities. The large variation of silica cell types within those genera increases the difficulty with which it can be applied satisfactorily, and it is suggested that silica cell shape can only satisfactorily be applied in conjunction with numerous other characters, and any attempt at identification purely by this character would be unsatisfactory.

Bicellular microhairs appear to be reasonably characteristic even to tribal level and, because of their uniformity, appear to be of value for application to this particular problem. The microhairs are obviously Eragrostoid and, by comparison with the sketches and data of Tateoka (1959), are more characteristic of the tribe Eragrosteae, as opposed to the tribe Chlorideae.

The anatomy of the leaf, with particular reference to bundle sheath anatomy, has been considered of importance since the data published by Avdulov (1931).

From this period the concept of a bundle sheath has never been questioned, but evidence from *Triodia* and *Plectrachne* (also *Festuca littoralis*) indicates that the parenchymatous sheath is more closely associated with the chlorenchyma and its function rather than the vascular bundle. In the majority of grasses the chlorenchyma and the vascular strands are separated by a parenchymatous sheath of some form and, since it surrounds the bundle, it was considered as a bundle sheath. Changing the concept from a bundle sheath to a chlorenchyma sheath has no effect on the anatomical characters used in taxonomy, but it will have important implications of physiological characters, e.g. that of starch formation and the associated biochemical pathways. The importance of size differences and functional differences between sheath chloroplasts and those of the chlorenchyma could perhaps be better appreciated by regarding the sheath as being more closely associated with the chlorenchyma.

The structure of the chlorenchyma, whether radially or diffusely arranged, has been utilized in conjunction with sheath type, but with *Triodia* the interpretation is difficult due to its remoteness from the vascular bundle.

Evidence from studies on the first seedling leaf has little reliability. The number of lodicules has been utilized in the delimitation of some groups (e.g. Bambuseae, Stipeae), but the variation is not sufficient for critical analysis to be applied. More critical studies are possible with lodicule morphology and the two lodicules in *Triodia* show distinct Eragrostoid affinities.

TABLE 5

Summary of Results of Characters Investigated

Character	*Danthonia*	Eragrosteae	Paniceae	Poaeae	Triodia-Plectrachne
Silica cells	Panicoid	Eragrostoid	Panicoid	Poöid	Eragrostoid +Panicoid
Bicellular microhairs ..	Panicoid	Eragrostoid	Panicoid	Poöid	Eragrostoid
Bundle sheath anatomy ..	Poöid	Eragrostoid	Panicoid	Poöid	Eragrostoid/ Panicoid
Lodicule shape	Oblong Danthoneae	Cuneate Eragrostoid	—	Two-lobed Poöid	Cuneate Eragrostoid
Chlorenchyma cell shape ..	Poöid	Poöid	Panicoid	Poöid	Poöid
Iodine staining	Poöid	Panicoid	Panicoid	Poöid	Panicoid
Starch grain morphology ..	Poöid	Panicoid	Panicoid	Poöid	Panicoid
Morphology of first seedling leaf	Poöid	Poöid	Panicoid	Poöid	Poöid

The use of chlorenchyma cell shape is a relatively new technique, but suffers the disadvantage of having an almost continual gradation between forms, rendering them of limited value in many cases. Starch grain type was considered of prime importance prior to the work of Tateoka (1962), who has since cast doubt on their assumed importance.

Staining fresh leaves with iodine is one of the simpler physiological characters which can be readily tested, and could become increasingly important in grass systematics once sufficient information has been obtained on the subject.

Considering all the characters (Table 5) investigated, the most satisfactory course appears to be to include *Triodia* in sub-family Eragrostoideae or Panicoideae. To this point only leaf characteristics have been mentioned (except for lodicules and chromosomes), but spikelet characteristics surely deserve consideration. On casual observation spikelet morphology indicates no apparent relationship to the Panicoideae at all, but, in some species, notably *T. irritans* (Capertee Valley), there is an apparently classical Eragrostoid type spikelet structure with numerous fertile florets with the lemma three-nerved. The lemmas of *Triodia* are often apparently three-nerved, but this nervation consists of three groups of three traces with the laterals (of each group) being lost in some cases (Burbidge, 1953), as in the *Triodia* from the Capertee Valley. It is suggested that this could represent a primitive condition in the sub-family Eragrostoideae (in lemma characters only) supporting Hartley's (1960) estimation of the centre of origin of the sub-family Eragrostoideae as being the arid regions of either Australia or South Africa.

CONCLUSIONS

Sub-family classification would place *Triodia* and *Plectrachne* in the sub-family Eragrostoideae, but tribal classification is more difficult. It is suggested that rather than attempting to establish new tribes, these genera should be placed in the tribe Eragrosteae, perhaps representing a " primitive " condition within that tribe.

Burbidge (1953) expresses the view that *Triodia* should be placed in the tribe Danthoneae which, in Australia at least, appears somewhat heterogeneous but microhair characteristics, as well as silica cell shape, iodine-staining results, leaf anatomy, etc., prevent it (Danthoneae) from being included in the sub-family Eragrostoideae. Arguments based on glume lengths and form of lobing appears rather arbitrary due to the large variation of these characters within the genus *Triodia*. Furthermore, the chromosome numbers reported are sufficiently large to accommodate any decisions based on base number (Eragrosteae: $n=10$ (5 ?) 12; Danthoneae: $n=6, 9, 12$—Bor, 1960).

Another problem worthy of consideration is the validity of the generic division between *Triodia* and *Plectrachne*. The establishment of a genus is based on a set of correlated characters which, initially, were concerned mainly with the inflorescence, and, using only these characters, a generic division is justifiable. However, it can be seen that there are no apparent discontinuities for the sets of characters investigated and, indeed, the characteristics of *Plectrachne* spp. are usually well within the range of variation exhibited by *Triodia*. Taxonomically, the two genera are very close, but it is suggested that the generic division be maintained even if only in consideration of the large number of species. This division could only be maintained if no intermediate lemma form is discovered, but, if a lemma is found with long lobes tapering into small awns with a comparatively small, slightly indurated base, then the generic division would be invalidated since this is the sole feature which distinguishes the two genera.

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